ALSO INSIDE: Big Customers Give HP an Earful | Smartphones to Get Dual-Core Chips

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COMPUTERWORLD.COM | AUGUST 23, 2010

Cloudy days loom for the traditional IT shop. **Here's how to weather the stormy decade ahead.**

SPECIAL REPORT

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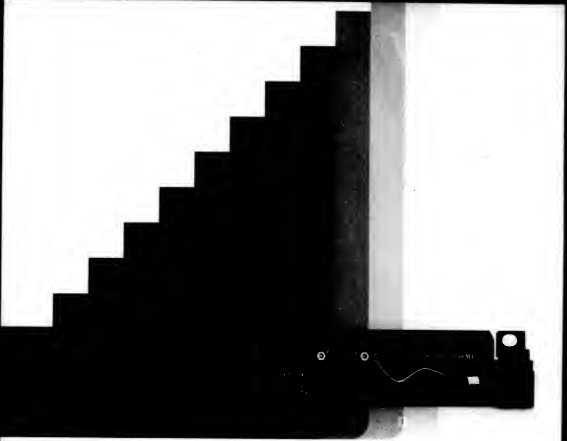

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HeadsUp

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HEALTH CARE

Doctors Warming Up to Mobile Devices

SMARTPHONES AND tablet PCs are poised to play a greater role in health care as doctors and patients embrace the mobile Internet, panelists at a mobile health technology conference in Boston said last month.

In a poll of 2,000 U.S. physicians by Manhattan Research LLC, 71% of the respondents said that a smartphone is essential to their practice, and 84% agreed that the Internet is critical to their jobs.

"Physicians are opportunistic in finding ways to improve efficiency," said Monique Levy, an analyst at Manhattan Research. Smartphones allow doctors to check e-mail, use mobile applications and surf the Web; they also support collaboration between physicians and patients, she said at the World Congress Summit on mHealth.

Doctors can use a device like a tablet to pull up patient information during a consultation and then use it to, for example, show a patient how disease spreads or how curvature of the spine occurs. It may be easier to share information that way than it is with a PC.

Apple Inc.'s iPhone is popular with many young doctors, and there are signs that the iPad tablet has a future in health care.

Kaweah Delta Health Care District in Visalia, Calif., already has 25 company-owned iPads and expects that number to grow to 100 in the next few months, according to Nick Volosin, director of technical services. In addition, he said that about 50 doctors have bought iPads themselves.

– Fred O'Connor of the IDG News Service, and Mitch Betts

SECURITY MONITOR

Study Questions Focus on Speedy Patch Regimens

Hackers are increasingly exploiting configuration errors and faulty application code – not the kind of software holes that get vendor patches – to steal information from computer systems, according to a new study by Verizon Communications Inc.

The "2010 Data Breach Investigations Report" covers 141 cases investigated either by Verizon or the U.S. Secret Service last year.

The researchers said one surprising trend was the continued decline in attacks that exploit software vulnerabilities like holes in operating systems.

In 2009, there was not a "single confirmed intrusion that exploited a patchable vulnerability," the report said. The hacking cases involved "SQL injection, stolen credentials, back doors and the like" – problems not fixed by vendor patches.

Verizon suggested that patching regimens, while important, may be overemphasized. "We've observed companies that were hell-bent on getting Patch X deployed by week's end but hadn't even glanced at their log files in months," the report said.

Of course IT shops should apply vendor patches, but instead of focusing on the "raw speed" of patching, the report said, IT professionals would be better off applying some of that energy to code review and configuration management.

– JEREMY KIRK, IDG NEWS SERVICE

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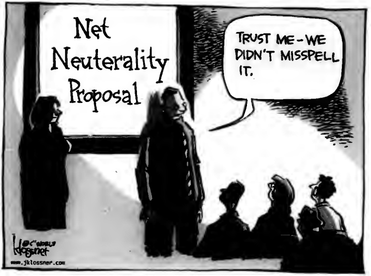
BETWEEN THE LINES
By John Klossner



JOB MARKET

Many IT Staffers Planning to Jump Ship

MANY TECHNOLOGY professionals — stressed-out over pay freezes and heavy workloads — are thinking about jumping to other companies as the economy improves, according to the latest IT Employee Confidence Index.

Polling firm Harris Interactive surveyed 4,367 employed tech workers, including 241 in IT operations, in the second quarter of 2010 and found that 38% believe the economy is getting stronger, compared to 32% in the first quarter. Technisource Inc., a national staffing and recruiting firm, commissioned the survey.

Breakout data from the survey indicates that many IT workers are already preparing to look for new jobs over the next year.

Harris reported that 61% of IT workers earning $35,000 to $50,000 a year said they are "likely" to start looking for a new job over the next 12 months. Meanwhile, 27% of IT workers now making $50,000 to $75,000 annually, and 36% of those whose salaries exceed $75,000, are "likely" to begin a job search.

"In some areas, salaries were cut or salary increases were suspended," said Sean Ebner, a regional vice president at Technisource. "As cuts were made in IT, the remaining staff was asked to do significantly more without additional compensation. It really did create some pent-up animosity."

Ebner said the survey found more interest in seeking new jobs than ever before.

The willingness to look for a new job doesn't yet mean that a job will be there. For instance, only 27% of IT workers earning $35,000 to $50,000 indicated that they expect more jobs will be available to them.

The state of the IT job market is a mixed bag. National IT hiring indexes have shown month-to-month improvement recently, but employers are still cutting. Last month, for example, pharmaceutical giant Eli Lilly and Co. confirmed plans to eliminate 340 IT jobs, on top of 140 positions cut earlier this year, as part of a broader corporate restructuring.

– *Patrick Thibodeau*

Micro Burst

The market for green data center equipment will grow rapidly, from $7.5 billion in 2009 to

$41.4B

in global revenue by 2015.

THINK TANK

Report: Cloud IT Ideal for Testing Innovative Ideas

Cloud computing isn't just a way to try to save money on IT infrastructure; it's a way to accelerate business agility and innovation, according to a recent report by PricewaterhouseCoopers.

Traditional, rigid IT infrastructures get in the way of innovation because they take months or years to deploy when a business decides to try something new, the report said, whereas on-demand computing services can be set up in days.

"Often the costs and time required to test a new product or service, or try a new way of engaging customers, are so prohibitive, they discourage companies from even trying them," according to the PwC report. "But cloud computing offers an inexpensive and flexible way to deploy the infrastructure as needed to test ideas."

For example, the report said that 3M Corp. is using Microsoft Corp.'s Azure cloud technology to quickly analyze new designs for consumer products, and McKesson Corp. is using SAS Institute Inc.'s "analytics cloud" to study marketing data.

However, the report acknowledged that cloud computing raises security issues, as well as regulatory compliance, tax and financial accounting considerations.

– MITCH BETTS

Former HP CEO Mark Hurd (right), pictured here at the opening of a customer service center in New Mexico late last year, was praised for instilling discipline at the firm but criticized for less-than-stellar customer service.

AP / SUSAN MONTOYA BRYAN

Users Advise HP On CEO Search

IT execs want Hurd's replacement to improve customer service and heed the needs of longtime customers. By Patrick Thibodeau

BILL SCHRIER, the Seattle city government's chief technology officer, is in a good position to evaluate the tenure of former Hewlett-Packard Co. CEO Mark Hurd.

Seattle has about 10,000 HP desktop and laptop computers, and it runs HP servers in its data center. The products are good, but the vendor's customer service is "continually challenged by communications," said Schrier. "A new CEO might want to refocus on the customer service and ordering part of it."

Improving customer service might be a long-term goal for the next HP CEO. In the short term, though, the company must deal with the reaction of employees, customers and investors to Hurd's abrupt and somewhat unseemly departure.

HP announced on Aug. 6 that Hurd had agreed to resign after settling a sexual harassment complaint. An internal investigation found that he had covered up a personal relationship with a marketing consultant. Hurd was cited for breaches of HP's business conduct policy, but not for sexual harassment.

Schrier said that Hurd's forced resignation probably won't affect Seattle's business relationship with HP, but he criticized Hurd's actions and his $12.2 million severance payment, which could soar to $30 million with stock benefits.

Les McCarter, director of IT infrastructure and operations at Hawaiian Electric Co., a big HP user, said he doesn't expect a change in leadership to affect the delivery of HP's products and services. He did say that the next CEO should work to maintain strong relationships with longtime customers. "Long-term continued revenue comes from existing customers," McCarter said. "Don't lose sight of us."

HP's former CEO instituted strong management discipline, but the company's brand image has become "dull," said Martin Reynolds, an analyst at Gartner Inc. "Nobody thinks of the company as producing stuff that's cool," he said.

"The board now has the opportunity to find someone who can build on that operational platform Mark built, but also build some flair into the company," Reynolds added.

Potential internal successors include Todd Bradley, head of the personal systems unit; Ann Livermore, executive vice president of HP's enterprise business; and Vyomesh Joshi, executive vice president of the imaging and printing group. External candidates include Michael Capellas, former CEO of Compaq Computer; and Joe Tucci, CEO of EMC Corp. ◆

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Smartphones Await Dual-Core Chips

Next-generation smartphone chips will bring higher-resolution HD capabilities for calls and videoconferences, analysts say. By Agam Shah

> **"The size, power and thermal constraints** put in place by the end equipment are more relaxed in a PC than in a smartphone.
>
> **ROBERT TOLBERT,** DIRECTOR OF PRODUCT MANAGEMENT, TEXAS INSTRUMENTS INC.

SMARTPHONES are on the verge of getting a major boost as chip makers ready dual-core chips that could accelerate performance for both applications and multimedia files.

Most of today's smartphones are capable of only 720p resolution high-definition video and come with processors touching speeds of about 1 GHz, but more and more users are demanding higher performance, analysts said. Next-generation dual-core processors could satisfy those demands by supporting full 1080p HD resolution for more demanding applications like videoconferencing.

Phone makers have yet to formally announce plans for smartphones based on dual-core chips, but the next-generation processors are coming quickly.

Qualcomm Inc. has already shipped its first dual-core processor, the MSM8660, to manufacturers and plans to start testing samples of a faster dual-core chip, the QSD8672, later this year. Texas Instruments Inc., meanwhile, is set to ship the dual-core OMAP4430 chip later this year. The chips could be running mobile devices by early next year.

Nathan Brookwood, an analyst at Insight 64, said that with users running increasingly demanding smartphone applications, the higher-performance dual-core chips are needed soon.

He noted that manufacturers could boost single-core processor performance by ratcheting up the clock speed, but that would lead to excess heat and battery drain. Adding another core would be a more power-efficient way to boost chip performance while preserving battery life, he added.

TI and Qualcomm said smartphones running their new dual-core chips will be able to render Web pages and video faster, and play back 1080p high-definition video.

Smartphones are following the same path as laptops and desktops, which already use multicore chips. Multicore technology first appeared in IBM's Power4 server chips earlier in this decade, and later trickled down to PCs with processors built by companies such as Intel Corp. and Advanced Micro Devices Inc.

The challenge to chip makers grows significantly as devices shrink. "The size, power and thermal constraints put in place by the end equipment are more relaxed in a PC than in a smartphone," said Robert Tolbert, director of product management for the OMAP smartphone business at TI.

TI's OMAP4430 is based on Arm's Cortex-A9 processor design and will run at a speed of about 1 GHz.

Devices based on Qualcomm's MSM8660 processor, which runs at 1.2 GHz, are expected to ship by the first quarter of 2011. The faster Qualcomm QSD8672, which runs at 1.5 GHz, will start sample testing by the end of 2010 and reach devices next year. ◆

Shah *is a reporter for the IDG News Service.*

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[1] Based on HP internal testing comparing hardware on HP ProLiant DL380 G4 to HP ProLiant DL385 G7.
[2] Source: IDC white paper sponsored by HP *Gaining Business Value and ROI with HP Insight Control*, May 2009

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hp

THE Grill

Patricia Calkins

Xerox's green maven drives efficiency and reduces waste from the plant floor on up.

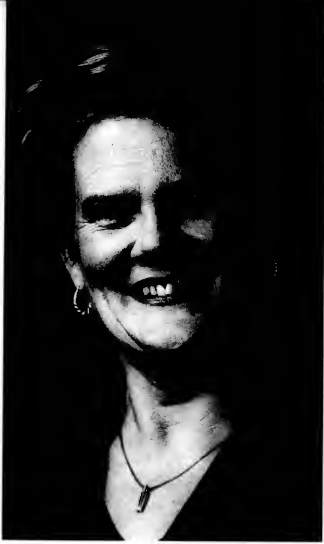
What's your favorite national park? Yosemite – it's just magical.

What did you want to be when you grew up? I wanted to be a biologist. This environmental stuff is based on biology, and biology is the ecosystem.

What kind of car do you drive? A Ford Escape. It isn't a hybrid.

What would the other kids have said about you in school? I was known as the person who didn't belong to any one clique. I was part of all of them.

What are your favorite books? *Silent Spring*, by Rachel Carson; *Capitalism at the Crossroads*, by Stuart L. Hart; and *The City Under the Back Steps*, by Evelyn Sibley Lampman.



PATRICIA CALKINS, *vice president of environment, health, safety and sustainability at Xerox Corp., loves the outdoors. But what she thinks she really brings to her job is a hatred of waste. After a stint as a chemist, she became an environmental engineer in 1986 at Western Electric, AT&T's former manufacturing arm, where she was charged with fixing compliance problems at a plant. From there, she has turned a passion for efficiency into an environmental mission.*

Western Electric was home to the famous Hawthorne effect experiments, one of the first "environmental" tests. Was it a good place to be an environmental engineer, or were you just someone who annoyed the rest of the company? It was a great place for me. I was tapped on the shoulder and asked to take on the challenge of being responsible for all of the wastes, particularly chemical aspects. They let me build my own sandbox. I went about trying to put myself out of a job by driving efficiencies within manufacturing. It seemed to me, if we thought about materials we were using before

Continued on page 12

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> “To actually get where you need to go for **the environmental or sustainable side of things**, it's critical to decouple the revenue stream from the material goods.

Continued from page 10

we put it into the product, we'd avoid a lot of waste. So I engaged folks in AT&T's research center in Princeton to think about that, and then I engaged the product design folks, and that's when my management stepped in and said, “Patty, you're going way beyond where you should be going.” I was going beyond the plant, into corporate functions. That's when I decided to leave AT&T.

What did you learn at that first plant? For people to be really effective in this field, it's important for them to have experience in a manufacturing environment where they really have to get their hands dirty. When I actually first took that new role at AT&T as an environmental engineer, my colleagues who were environmental engineers and safety folks asked me, “How come people listen to you and work with you on stuff, whereas when we go out in the manufacturing plant, everyone hides or wants to know what they did wrong?” I think it's because I speak to them in their language. They are getting value from me. I'm not acting like a cop, saying, “This is the Code of Federal Regulations [CFR].” I say, “Look at this inefficiency; that's lost dollars. You can be more efficient, and I can meet my 40 CFR things.” People want to do the right thing. My opportunity and my team's opportunity is to help them understand what that thing is.

What kind of things arise? Manufacturing is taking materials and making them into a product. There is waste associated with that. The employee safety professional would say, “We want to increase exhaust rates to suck chemicals out of the work environment to increase safety.” The environmental people would say, “We don't want to discharge this into the environment.” Some of us realized that if we don't create it to begin with, that's better. And if there is waste, how do we make it reusable, from a recyclable standpoint?

You've said that you wanted to stay technical, to avoid management. Yet here you are. Back in high school, I did one of those little tests that tell you the best career path for you. It said the worst direction for me would be to work for a large corporation as a manager. But somehow I found my way here. I think it was a natural progression. You can do a lot when you're in an individual tech role, but you have the opportunity to drive more significant change if you're in a management position. My style is that I feel more like I'm a team lead than a manager of people.

You work at a company that makes products, and those products produce documents. Xerox has been transitioning to more of a services company in the last 10 years. From the environmental standpoint, it makes sense, because — have you ever heard the term “servicizing”? It's a Holy Grail of environmentalists. The notion is people don't care about the widget, but the value it delivers. To get where you need to go for the environmental or sustainable side of things, it's critical to decouple the revenue stream from the material goods. Xerox is doing this on the manufacturing side.

How can IT think differently about the environment? I have to replace my laptop every couple of years. That's a tension between the material good and being able to have access to computing power. My sense is that the whole IT world is in an evolution right now toward being more conscious of this. We've found, in inventorying print capabilities in organizations, the average utilization rate is 1% to 2%. The rest of the time, they're sitting idle but still drawing power in sleep mode. They're usually seven to eight years old, so they don't meet Energy Star specifications. So can we get rid of the unnecessary printers, rather than just replace the current infrastructure? Companies can reduce costs by like 30% but also reduce energy consumption by 30%.

Also, I think IT will be very helpful in driving forward the opportunity to measure, track and provide feedback on practices and behaviors. You really need that to get individual behavior changed.

– Interview by **Michael Fitzgerald,**
a freelance writer based outside of Boston and a 2011 Nieman Journalism fellow at Harvard University

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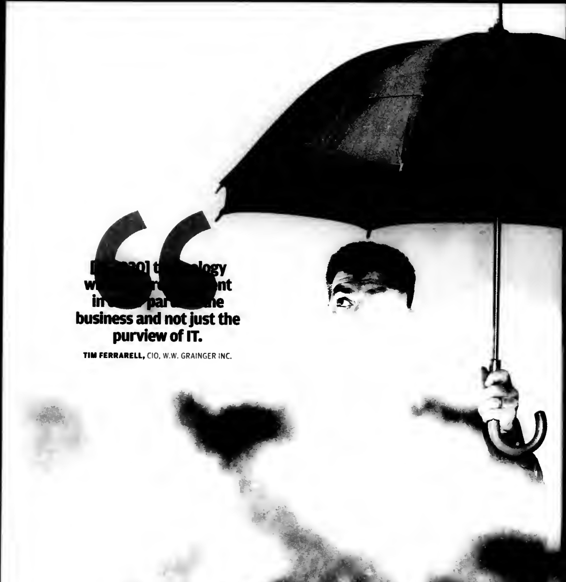

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TIM FERRARELL, CIO, W.W. GRAINGER INC.

IT Careers 2020

When the cloud blots out the classic IT shop, only the tech-savvy business experts will weather the storm.

BY JULIA KING

WELCOME TO the IT organization of the year 2020 — and brace yourself, because it's a far cry from the department you find yourself in today.

Computer programmers have gone the way of the typing pool. So have one-dimensional technology specialists like network engineers. Deeply technical professionals with multiple certifications in virtualization, networking and security technologies work primarily as component engineers and IT architects. Job titles include cloud architect, cloud capacity planner, cloud infrastructure administrator and integration architect.

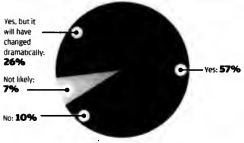
The people who work in these roles design and maintain the underlying framework or architecture. On top of this architecture sits a shifting inventory of cloud services, plug-and-play Web-based applications and easy-to-use proprietary software components that together represent the key source of a company's competitive advantage.

How these various components will be innovatively mixed and matched will largely be decided by marketing, supply chain and

STEPHEN WEBSTER / WONDERFUL MACHINE

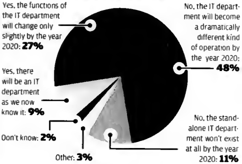
NEW ROLES

Do you think your current IT job function will exist in 2020?



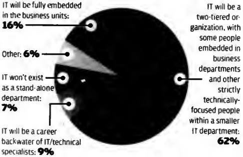
NEW SHOPS

In 2020, will there be a traditional IT department as we now know it?



NEW WORLD

What do you think the IT shop of 2020 will look like?



SOURCE: EXCLUSIVE *COMPUTERWORLD* SURVEY OF 465 IT PROFESSIONALS, JULY 2010

> **You need to get skilled in emerging technologies and develop a deep technical skill set.**
>
> **MARK O'GARA,**
> VICE PRESIDENT, HIGHMARK INC.

other business functions and divisions that will be guided by a second tier of IT professionals: super-IT-savvy business experts who reside in the business. They don't build software, but they work with the business to invent new products and services. They also assemble the software components needed to bring those offerings to market. They have titles like business systems analyst and business solutions consultant.

Sound far-fetched? It's only 2010, but already, the savviest companies are well along the path of implementing this kind of two-tiered IT workforce structure.

"2020 is already here," says Ian Patterson, CIO at St. Louis-based Scottrade. There, the IT organization includes project managers and business analysts with deep analytical and communication skills, and technical architects, who make sure "we don't step on ourselves by doing something that will negatively impact the business from a technology standpoint," Patterson says.

Going forward, CIOs and IT employment experts predict that this bifurcation of IT roles will vastly accelerate, with most professionals falling into one of two major categories: technical specialists and business specialists.

Tier 1: Tech Specialists

Technical specialists are the people who work in a centralized IT or business services organization. If you want to work here, you need to know about data standards, information standards, virtualization, networks, mobile technology and IT architecture, among other things. "You need to get skilled in emerging technologies and develop a deep technical skill set," says Mark O'Gara, vice president of infrastructure at Highmark Inc., a health insurer in Harrisburg, Pa.

Overall, this organization will have far fewer people than today's IT department, but these workers will have an extremely rich set of technical skills, and they will understand precisely

Megatrends 2020

As IT operations become inextricably linked with business operations, it seems likely that whatever big trends affect the business will have ramifications for IT.

BUSINESS TREND	IT IMPLICATIONS
Big businesses will get bigger. Small businesses will survive. And midsize businesses will be squeezed out. Expect more mergers and acquisitions.	**IT professionals will work for either very big companies or very small ones. And IT vendors will be either giants or boutiques.**
Government regulations will take up a growing portion of management's time and effort.	**Even more IT work will be devoted to regulatory compliance and audits.**
Consumers will expect "social responsibility" from the companies they do business with.	**IT professionals will need to help their employers meet consumer expectations for ethical behavior, honest accounting, privacy safeguards and green IT.**
The product design and marketing cycle – from the time a product is invented to the time it's imitated – is shrinking rapidly.	**IT shops, which are increasingly involved in new-product development, will need to help the company get products to market at warp speed.**

MORE PREDICTIONS: http://tinyurl.com/MB-IT-2020

how their business makes and loses money and how all transactions flow through the enterprise.

This is where the enterprise's overall business process and technology architecture will be maintained. The infrastructure will be made up of multiple services furnished by a variety of outside suppliers, coupled with software components that were designed both externally and in-house and that are extremely intuitive and easy for various business functions to assemble and use competitively.

As business units put together these applications, "the critical role the IT department will play is ensuring that business value is not lost through fragmentation," says Andrew Morlet, global director of the strategy and transformation practice at IT consultancy Accenture PLC. "IT will play a central coordinating role that protects the interests of the entire enterprise over the divisions themselves."

Cummins Inc., a worldwide supplier of diesel engines that's based in Columbus, Ind., is in the process of completing a major

IT Job Seekers Need Not Apply

AS IT ROLES MOVE UP the value chain, companies like Johnson & Johnson, State Street, W.W. Grainger, General Mills and Xerox are looking to hire smart, tech-savvy, collaborative business professionals for 20- or 30-year multifaceted careers, not for IT jobs.

"I believe the idea of hiring people for a job is well past," says LaVerne Council, CIO at Johnson & Johnson. Instead, Council and other savvy IT and business leaders are more focused than ever on developing sophisticated job-rotation programs and flexible career paths that offer employees exposure and experience throughout the enterprise and significantly boost their opportunities to move up and branch out within the company over time.

"We have a talent management process where we help people coach their careers into various different roles – business to IT, and IT to the business. But we do it as well within IT, from infrastructure to applications to change management and to all of the other various functions within IT," says W.W. Grainger CIO Tim Ferrarell.

So far, it's a strategy that appears to be working. Ferrarell, for example, started out at Grainger in merchandising and product management, then progressed through marketing and strategy before moving to IT seven years ago. Grainger's CEO, Jim Ryan, is a former CIO.

At Xerox Corp., the trend is similar. The executive driving Xerox's transformation from a hardware vendor to a services provider is a former applications portfolio manager. The former head of IT architecture has moved over to take charge of the company's global supply chain.

"The movement of talent between organizations is at the most senior levels and pretty significant," says Xerox CIO John McDermott. "The previously impenetrable wall between IT and the business became permeable."

At General Mills Inc., the career strategy revolves around hiring the best and the brightest and then keeping them engaged and challenged enough to want to spend the rest of their careers with the $14.8 billion company. The average tenure at General Mills is about 13 years for an IT staffer and 16 years for an IT manager. Turnover is below the industry average of 5%. Also notable is that more than 15% of the company's IT staffers hold MBAs.

"Having an MBA is something we value because of our business process focus. The main focus is on the business and always has been," says Mike Martiny, vice president of information systems at General Mills. Still, he adds, "the starting point for everything is technical competency. There's time to grow everything else."

"With the growing importance of architecture, companies realize how valuable highly tenured people are," says State Street CIO Chris Perretta. "We're desperately looking for ways to attract people who are talented and want to stay for the long term. When we hire someone, we really want to hire them with the mind-set of belonging to the organization."

– JULIA KING

The Rise of the Chief Architect

BUSINESS PROCESS FRAMEWORKS, enterprise road maps, end-to-end operations and centralized architecture: Savvy CIOs use terms like those a lot these days. They all refer to an enterprise's highly complex yet continually tweaked and modified processes and their IT blueprints for doing business and turning a profit. In many cases, they represent the very source of a company's competitive advantage.

Developing these blueprints and then ensuring that various business units and divisions sprawled about the globe operate in sync with them is the increasingly critical role of the chief architect.

"Architects are really important, and they're going to be growing in importance," says Brian Cobb, senior vice president of mortgage operations and former vice president of technology infrastructure and operations at Fannie Mae.

Cobb and his team have spent 18 months re-engineering business processes at the government-sponsored enterprise and developing what he calls an "enterprise reference model" on which to run a more flexible and responsive business. "Now we're building against that architecture, which is a key tool to compete in the current economic environment," he says.

Xerox Corp. CIO John McDermott describes the role of chief architect as "the hardest job in any IT organization."

"The most difficult set of skills to recruit are blindingly brilliant IT architects," McDermott says. "It's an almost impossible job because of the scope of process knowledge you need to possess and the scope of [technical] knowledge you need on how to enable that process architecture."

At Xerox, the role is filled not by a single person, but rather in a center of excellence "where we combine and collocate business process owners with technology platform owners. That makes the challenge more manageable," he says.

Cummins CIO Bruce Carver says his company "has just made a fairly sizable investment in the architecture function." The reason, says Carver: "It's central to our success."

The diesel engine maker's goal is to streamline operations by, among other things, leveraging the same fundamental business rules and technology across its various divisions and business units, which span 70 countries. At the same time, Cummins is dispersing more and more technology-savvy business experts into various business functions.

The upshot: "As we start to have more technology-savvy people in the organization, they'll go off and convince business leaders that they need a solution, and at the end of the day, it will drive up costs and we'll have incompatibility issues," says Carver. This, he says, is where the chief architect plays a critical role in building or buying any and all technology so that it fits into the overall blueprint.

At State Street, the architect role is so important that CIO Chris Perretta elevated the position to report directly to him.

"The reason and the fact of the matter is that how we build things matters," he says. "It's not just an intellectual exercise. It has a material impact on the performance of the organization."

– JULIA KING

> **Ten years from now, it will be all about how to assemble software, not how to build it.**
>
> **KEN SPANGLER,**
> CIO, FEDEX GROUND

restructuring of IT. CIO Bruce Carver estimates that in the end, "only about 5% of IT roles will be purely IT, and these roles will be few and far between."

Cummins' centralized IT department is staffed by technical experts charged with creating standards and structure and managing the overall cost of the IT function. This is the home of the IT architecture group — and architect is fast becoming the hottest role in IT (see story at left). Another services and support group is made up of third-party service providers and a limited number of Cummins employees. All other employees are business specialists in what Cummins calls "business-facing roles."

All indications are that by 2020, a big chunk of technical specialists' work will involve integrating a broader array of technologies and services into the overall enterprise infrastructure, CIOs say. That's why a broader set of networking, software, virtualization and other skills will be required.

This trend hasn't been lost on vendors like EMC Corp., which is developing a cloud certification to complement its storage certification. Additionally, EMC is working with its security division, RSA, and virtualization vendor VMware Inc. to develop multidisciplinary certifications for technical specialists, says Tom Clancy, vice president of education services and productivity at EMC.

Tier 2: Business Specialists

The work of business specialists is matching the right IT tool to the business need at hand. These are super-IT-savvy business experts who understand how the business works, how transactions flow, what makes and loses money for the company, and where and how technology can help or hinder the business.

As futurist and *Computerworld* columnist Thornton A. May sees it, this is where the upwardly mobile career action is, as well as the greatest coolness factor.

"IT's future revolves along three interrelated dimensions," May says, all of which converge in this IT career track. Those dimensions are innovation, which he defines as the ability to convert ideas into money; business analytics, which involves operations research, data mining, data integration, reporting and statistics; and risk management, which requires a keen knowledge of business processes. This is one of the best areas to look for work if your job is being automated or outsourced. "Each of these critical disciplines promises good future career opportunities," May says.

Regarding educational degrees, May anticipates a new breed of sheepskin, one that reflects both business knowledge and statistical analysis expertise.

Business specialists will play a leading role in various business functions, performing work that today can often only be performed in IT, says Tim Ferrarell, CIO at Chicago-based industrial distributor W.W. Grainger Inc.

In 2020, "technology will be easier to use. Therefore, it will be more prevalent in other parts of the business and not just the purview of IT," says Ferrarell. "We're more and more attracting and rotating people through business and IT functions so people understand how technology can be used to serve customers better. It's about having employees who are versatile and who know various technologies and business processes. It makes us more flexible and reduces risks. Rotation creates versatility." (See story, page 17.)

Many CIOs share the view that the emerging job title of business specialist is an indication that IT roles are moving up the value chain.

"The IT role becomes much more about how to use technology to help the business rather than how we provide the technology," says Ken Harris, CIO at Shaklee Corp., a nutritional products company in Pleasanton, Calif.

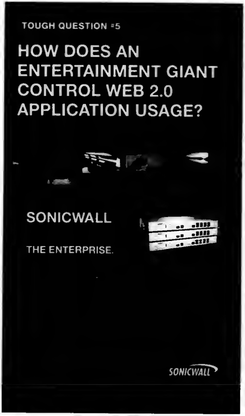
At Boston-based financial services company State Street Corp., CIO Chris Perretta says that with a two-tiered IT workforce, "there are opportunities for our IT personnel to take much more of a leadership position on how business processes are designed in the long term."

State Street is formally defining the skill sets it wants in its workforce, says Perretta. Architectural skills are absolutely critical, and for pure technologists, "there's an opportunity to go much deeper into technology." For those "with more of a business solutions bent, there is an opportunity to get upstream a lot farther," he says.

Harris puts it this way: "When IT people move out into the business, IT moves up the value chain," because it moves closer to the customer and closer to the revenue line. "Within the IT department, all the remaining IT roles require a higher level of proficiency," he says.

Ken Spangler, CIO at FedEx Ground, says his company has historically focused on the role of business specialists in managing large, complex projects. But going forward, it will further sharpen this focus, dedicating those experts to business functions so they can come up with technology solutions to business problems early on, before they have a chance to evolve into large projects.

"The transformation is well under way," he says. ◆


TOUGH QUESTION #5

HOW DOES AN ENTERTAINMENT GIANT CONTROL WEB 2.0 APPLICATION USAGE?

SONICWALL

THE ENTERPRISE.

SONICWALL

People who are purely involved in technology operations – the "run" part of the business – will be outsourced over time. These are the people who will find jobs with service providers.

A lot more things that we do today inside the technology function will be able to be done outside the technology function. The real techies will go to the vendors and service providers.

The IT environment at user companies will shrink, and the new IT tasks will be much more aligned with using technology in the business rather than creating technology.

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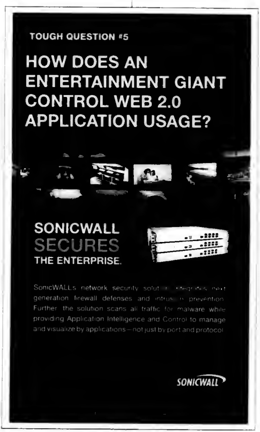

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SONICWALL SECURES THE ENTERPRISE.

SonicWALLs network security solution integrates next generation firewall defenses and intrusion prevention. Further, the solution scans all traffic for malware while providing Application Intelligence and Control to manage and visualize by applications—not just by port and protocol.

SONICWALL

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PAUL GLEN

IT Leaders: Master the Upcoming Culture Change

Tomorrow's IT groups will have more balanced priorities, raising the importance of human relationship management.

FOR ALL YOU IT leaders out there, *Computerworld*'s predictions for the future of the IT workforce aren't so much a thought experiment, but a tangible challenge. You've got to do something now to prepare your organization to thrive in this new world.

But let's be honest — planning for 2020 sounds like a bit of a joke. There's a good chance that many of the people who are working in your organization today will have moved on by then — maybe you, too. So, what do you do with this information?

I think these three premises can serve as guides for useful action:

1. Purely technical work will be more commoditized than it is today. With the rise of cloud computing and consumer technology, it will make economic sense to outsource a lot of basic services that offer no competitive advantage to an organization. Not only will outsourcing save money, but it will allow you to focus on the people and technologies that offer the greatest benefits.

2. Business and technology will continue to become more tightly intertwined. Since IT organizations evolved from data processing shops, and systems started following the cost curve of Moore's Law, technology has become enmeshed in nearly every aspect of operations. Today and in the future, nearly all business innovations will have technology at their core.

3. The connection between business and technology will involve people, not just processes. While technology has become indispensable to business, the relationship between the people who deliver technology and those who devise, build, sell and deliver products and services has never been smooth. Despite innovative experiments with processes, the effectiveness of the relationship between business people and technology people is ultimately determined by the knowledge, goodwill and mutual understanding of the people themselves.

So, imagine your IT organization in the future: It will be more tightly focused on developing systems that deliver business value than it is on supporting infrastructure, and it will be more focused on buying than it is on building and maintaining. This organization's key competencies will be leveraging commoditized technology in innovative ways, building and maintaining cutting-edge systems that offer competitive advantages, and establishing and maintaining relationships with both outside vendors and internal stakeholders.

Assembling an organization that values and celebrates these skills is a long-term proposition. Most of today's IT shops are built on valuing one thing: technical prowess. Tomorrow's IT groups will have more balanced priorities, raising the importance of human relationship management to the same level as technical chops.

There are several ways to signal to your people that relationship management is gaining value.

New roles: Start by working with your business partners, internal and external, to create positions focused on managing relationships and projects.

Rewards and recognition: Use public recognition to signal to the group what's important.

Prominence and presence: Everyone notices who's in the room when big decisions are made. Functions that are left unrepresented are regarded as lacking influence and importance.

If you consistently stress the importance of relationship management, people will begin to understand what the organization values, and you will be changing the culture, preparing it for the future. ◆

Paul Glen is a consultant who helps technical organizations improve productivity through leadership, and the author of the award-winning book *Leading Geeks* (Jossey-Bass, 2003). You can contact him at info@paulglen.com.

IT CAREERS 2020

STEPHEN WEBSTER / WONDERFUL MACHINE

20:20 Vision

Whatever your career stage – IT newbie or seasoned professional – take action now to prepare for the year 2020. **BY MARY BRANDEL**

INFORMATION TECHNOLOGY has always been a fast-changing field. But nothing compares to the expected sea changes in the next decade that will impact the career plans of every generation of IT worker.

"The rate of change has accelerated dramatically," says Alain Chesnais, president of the Association for Computing Machinery (ACM) and founder of Visual Transitions, which specializes in computer graphics and social networks. Consider, he says, that graphics chips are doubling in capacity every six months. That translates into a thousandfold increase in capacity over a five-year period — the average shelf life of most game platforms. "We've never seen anything like it in any industry," he says.

As the effects of these types of advances ripple across the corporate world and combine with the forces of the Web, mobile computing, consumerization and virtualization, "traditional IT organizations won't look [the way] they do now," says Thomas Druby, an IT executive and former CIO at a large insurer. "Help desks, network and desktop support, LANs, telecom — all those things are becoming a commodity that organizations will pay someone outside the company to do [so they can] focus their money and talent on niche areas that bring higher business value." These niches, he says, might require the services of business process specialists, people who can analyze and present business data, security experts and vendor relationship managers.

With that in mind, we've gathered some ideas on the actions that IT workers at three distinct stages of their careers need to take to prepare for the year 2020.

The Pipeliners

These are the college students who are getting degrees now and will fill payrolls in 2020.

Today's college students don't know life without a phone in their pocket and constant connectivity with family and friends. For this reason, they will in some ways be better prepared than previous generations for the pervasively mobile and services-oriented technology landscape of 2020.

At the same time, colleges can't adapt their curricula fast enough to prepare students for the complexities of cloud computing and virtualization, not to mention specific technologies such as Microsoft SharePoint, observers say. Recent graduates also seem naive when it comes to business basics and how computing foundations apply to the real world, says David Buzzell, CIO at The Sedona Group, a Moline, Ill.-based workforce management services provider.

"You bring a programmer or network administrator on board, and they don't have the big-picture view of how the business runs," he says. One recent hire, he notes, could program user interfaces but had no concept of a database. Another didn't know what an invoice was.

Druby agrees that colleges are in continual catch-up mode and have only recently added project management and soft skills training to computer science programs.

"They're about five years behind where they need to be," he says. Students can fill that gap by pursuing internships, he suggests. "It can help them understand what the business is about, as well as the components of technology they wouldn't pick up at a university."

Tom Silver, a senior vice president at Dice.com, says more students are doing just that. And combining a technology degree with business knowledge will lead them to the higher-paying areas of IT.

Andrew Hrycaj is accomplishing this by working full-time as a network consultant while studying for an associate's degree, with the goal of earning a bachelor's. Hrycaj agrees that there's "an extreme gap between the academic approach to IT and the real world, especially when it comes to cloud computing and virtualization. He believes the only way to learn how technology is really used is through experience. "It's the difference between being in it as opposed to talking about it from a thousand-foot view," he says.

Students can also seek out instructors who have spent time in industry. At Macomb Community College, for instance, Martin Kohl, professor of IT, not only teaches Java programming, but also has his students build an electronic health records system and then refer back to it throughout the semester. "We like to focus on, How can they apply this when they walk out the door? Can they use it?" he says.

To address the gap between college and real-world experience, the ACM has introduced new curriculum guidelines for undergraduate IT programs that address how computing is manifested in industries such as law, health, finance and government, Chesnais says. The guidelines are also influenced by trends such as the globalization of IT development processes, the ubiquitous use of Web technologies, and the emergence of Web services, software-as-a service and cloud computing, he says.

Gretchen Koch, who leads CompTIA's "Getting America Back to Work" initiative, agrees that young professionals should think about IT as it's integrated into industry sectors. "They need to know about the industry they're participating in and the regulations those industries are bound by," she says. CompTIA is developing certifications for health IT and is working on programs for cloud security.

The Newcomers

These are the Gen Y'ers – people in their 20s and early 30s who are in the early stages of their careers now and will dominate the ranks in 2020.

With its famously informal approach toward work, enthusiasm for social networks and ability to take digital multitasking to new heights, this group has already forced some changes in corporate culture and even in the technologies that IT supports.

Where the Gen Y'ers could stumble, Silver says, is in their upward progression toward roles that require relationship-building skills. Although they have a

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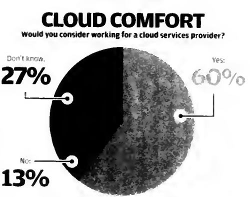
CLOUD COMFORT

Would you consider working for a cloud services provider?



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READY FOR WHAT'S NEXT

What's at the top of your agenda to prepare your career for 2020?

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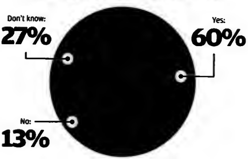

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SOURCE: EXCLUSIVE *COMPUTERWORLD* SURVEY OF 465 IT PROFESSIONALS, JULY 2010

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Where the Gen Y'ers could stumble, Silver says, is in their upward progression toward roles that require relationship-building skills. Although they have a natural propensity to communicate digitally, they also need to understand the importance of face time. "Texting and e-mail are no substitute for a relationship," Silver says. This group could learn a lot from the older people at work, he contends, and forming cross-generational relationships would help them gain perspective on fitting into the higher levels of the organization.

Some in this age group may need prodding to consider taking on bigger roles. "I haven't seen many with the drive or desire to get to that level," says Buzzell.

Buzzell would also like to see Gen Y'ers adopt a more sophisticated perspective on the ramifications of technology decisions, particularly when it comes to security. "Younger people are so adept at working in a mobile environment and feeling free with what information they disclose that they'll have a harder time understanding security issues," he says.

On the positive side, Buzzell adds, Gen Y'ers are fearless in the face of technology change. At Sedona, he says, there was a lot of pushback from the 35-to-50-year-old staffers recently when IT introduced a new Web-based application. But the younger set was more likely to ask why they needed training at all.

It's that versatility, penchant for innovation and hunger for new challenges that James Sims loves about Gen Y workers. While they require a different management style — one that measures results, not hours logged in the workplace — "they're stimulated by variety and challenge, and they're much more capable than other age groups of working as a team and collaborating," says Sims, who is CIO at SaveMart Supermarkets.

Even their multitasking is a strength, he says, as is their ability to communicate on multiple channels, including IM, Skype, texting and smartphones.

The Midcareers

» These are the Gen X'ers and boomers who are setting the tone now and will be hitting the midpoint of their careers or winding down in 2020.

IT professionals at or near the midpoint of their careers face the biggest challenge in the next decade, observers say. Those closest to retirement age in 10 years may have the easiest time, since the transition to the new IT won't happen overnight, Druby says.

But people who are currently in their late 30s and 40s, he says, will need to retool quickly. "Of all the age ranges, this is the most vulnerable," he says. "Whatever you've been doing in your professional life, the new technologies are going to be vastly different." A willingness to embrace change will be essential, and employers will need to see enough value to invest in retooling these workers.

Sims agrees that the younger segment of this group — the Gen X'ers — will be particularly challenged, but for a different reason. Compared with Gen Y, he says, they are less adept at working in groups, more entitlement- than achievement-oriented, and less willing to accept advice or mentoring. While both populations chafe under traditional work styles and reject formal rules, Gen X seems more inclined to complain about perceived constraints versus suggesting or inventing new ways of doing things, he says.

Sims says he anticipates that there might be some leapfrogging, with Gen Y workers managing Gen X'ers. "If you can't work well in a group, how are you going to lead groups and foster team behavior?" Sims asks.

Buzzell, who has been in IT for 20 years, says responding to the change mandate is essential, especially in an industry famous for its youth bias.

The key, he says, is to keep investing in yourself, through reading and training, in both IT and business areas. One rule of thumb suggests spending 3% of your salary and time in self-training, he says. Buzzell attends industry conferences and has been doing research in lean manufacturing, Six Sigma and business processes. "It's my future — if I want to stay relevant, I'm responsible for that," he says.

Silver emphasizes the importance of diversifying your skill set, possibly through job rotation programs. "If you've been writing code for a while, maybe there's a project management rotation you can take, or you can work in different business units," he suggests. There will be a growing need for people with business intelligence skills, as well as leadership and communication capabilities, he adds.

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DAVID BUZZELL,
CIO, THE SEDONA GROUP

Midcareer workers should also value their business experience — something younger professionals simply don't have. "They know how to navigate the organization, and the ones just coming through don't. They want to be given a task and be left alone," Kohl says.

Chesnais agrees. "Younger people don't know what's impossible," he says. "Sure, they're more familiar with the newer tools, but I don't think that outweighs the experience of knowing how to get from one stage of a project to the next, for instance." Any deficits in your comfort level with new devices can be filled through a conscious effort to educate yourself.

Keeping up with change can be as simple as experimenting with the latest consumer devices. Druby carries an iPad, and Sims uses three different smartphones and recently ordered an Android-based tablet. Chesnais says that at a recent meeting, half the people in the room had iPads. "Any professional in this field should be putting [the iPad] through its paces to see what this changes in our workspace," he says.

"If you're not willing to build a new tool set, you'll be pushed to the side of the road," Kohl says. "But for people with the ability to change, the future is very promising." ◆

Brandel *is a* Computerworld *contributing writer. Contact her at marybrandel@verizon.net.*

5 Indispensable IT Skills of the Future

IT knowledge will be more ubiquitous, but employers will clamor for these five specialized tech skills. **BY STACY COLLETT**

IT CAREERS 2020

IN THE YEAR 2020, technical expertise will no longer be the sole province of the IT department. Employees throughout the organization will understand how to use technology to do their jobs. Yet futurists and IT experts say that the most sought-after IT-related skills will be those that involve the ability to mine overwhelming amounts of data, protect systems from security threats, manage the risks of growing complexity in new systems, and communicate how technology can increase productivity.

1 Analyzing Data

By 2020, the amount of data generated each year will reach 35 zettabytes, or about 35 million petabytes, according to market researcher IDC. That's enough data to fill a stack of DVDs reaching from the Earth to the moon and back, according to John Gantz, chief research officer at IDC.

Demand will be high for IT workers with the ability to not only analyze dizzying amounts of data, but also work with business units to define what data is needed and where to get it.

These hybrid business-technology employees will have IT expertise and an understanding of business processes and operations. "They are people who understand what information people need" and how that information translates into profitability, says David Foote, president and CEO of IT workforce research firm Foote Partners LLC. "You'll have many more people understanding the whole data 'supply chain,' from information to money," he says.

2 Understanding Risk

Risk management skills will remain in high demand through 2020, says futurist David Pearce Snyder, especially at a time when business wrestles with growing IT complexity. Think of IT problems on the scale of BP's efforts to stop the Gulf of Mexico oil spill, or Toyota's work to correct sudden acceleration in some of its cars, Snyder says.

"When you're in the time of rapid innovation," which is happening now and will continue into 2020, he contends, "you run into the law of unintended consequences — when you try something brand-new in a complex world, you can be certain that it's going to produce unexpected consequences." Businesses will seek out IT workers with risk management skills to predict and react to these challenges.

3 Mastering Robotics

Robots will have taken over more jobs by 2020, according to Joseph Coates, a consulting futurist in Washington. IT workers specializing in robotics will see job opportunities in all markets, he adds.

"You can think of [robots] as humanlike devices, but you have to widen that to talk about anything that is automated," Coates says. Robotics jobs will involve research, maintenance and repair. Specialists will explore uses for the technology in vertical markets. For example, some roboticists might specialize in health care, developing equipment for use in rehabilitation facilities, while others might create devices for the handicapped or learning tools for children.

4 Securing Information

Since we're spending more and more time online, verifying users' identities and protecting privacy will be big challenges by 2020, because fewer interactions will be face-to-face, more personal information may be available online, and new technologies could make it easier to impersonate people, according to a report by PricewaterhouseCoopers. Teleworkers will also represent a larger portion of the workforce, opening up a slew of corporate security risks.

"We're in a dangerous place," because many employees are tech-savvy, yet they "don't understand the first thing about data security," Foote explains. "That will change in 2020," when companies will cast an even wider net over data security — including the data center, Internet connectivity and remote access, he predicts.

5 Running the Network

Network systems and data communications management will remain a top priority in 2020, but as companies steer away from adding to the payroll, they will turn to consultants to tell them how to be more productive and efficient, says Snyder, who follows predictions from the U.S. Bureau of Labor Statistics. "You have already cut as many people as you can, so now you can only increase productivity," he says. "Someone has to come in here and tell me how to better use the technology that I have." ◆

Collett *is a* Computerworld *contributing writer. You can contact her at stcollett@aol.com.*

Meet the IT leader of the future: 27-year-old software developer Kristine Harper says teamwork and flexibility will be hallmarks of her generation's leadership style.

When Gen Y Runs the Show

The work environment will be reshaped to accommodate flexibility and flat structures when this generation takes charge.

BY MARY K. PRATT

IT CAREERS 2020

KRISTINE HARPER thinks she and her millennial colleagues will run things better when they're in charge.

"Our generation will be a little bit more fun, encouraging, flexible, positive. There'll be fewer meetings, more networking, more teams," she says.

Flextime will be ubiquitous, and managers will support employees in their efforts to balance work with other interests. Good jobs will be those that always challenge. A day's work will be measured by results, not hours at the desk.

Make no mistake: The workplace that this 27-year-old software developer envisions a decade out won't look like the typical office of the 20th century. "If I were a manager in the future, I would focus on increasing motivation and community in the workplace," she says. "I would try to emphasize the importance of employee get-togethers outside of [work] to promote a stronger sense of community and friendship. I think when you feel strongly about the workplace and the people involved, there is a sense of motivation that comes with that."

Generation X'ers and millennials — those from Generation Y — are now becoming managers, and they'll take on more of the

PHOTOGRAPHY BY JOHN SOARES

top positions in the coming decades. As they do, they'll bring their own philosophies about how the workplace should operate. Expect a more open and flexible work experience, where careers don't necessarily just advance up the corporate ladder but rather move laterally and possibly down, too, depending on changing personal and professional ambitions and needs.

"We want to be successful in our jobs, but just in a different way. It doesn't mean being in our office every day 9 to 5, it means getting your job done, whatever your job is," says Harper, who works in research and development at Neon Enterprise Software in Sugar Land, Texas, and is project manager of zNextGen, an offshoot of the IBM user group Share for young professionals.

Fulfilling the Dream

Workforce consultants say this expectation of flexibility and accommodation signals a new way of working, built on what the previous generations have pushed for.

Gen Y workers "don't see career paths in the traditional sense. They're looking for companies that are much more flexible," says Celia Berenguer, co-author of the June 2009 report "Catalyst for Change: The Impact of Millennials on Organization Culture and Policy," from Monitor Co., a Cambridge, Mass.-based consultancy. "The traditional development and training processes are probably the least effective for millennials."

Carol Phillips, president of market research firm Brand Amplitude and an adjunct professor of marketing at the University of Notre Dame, has studied millennials and what drives them. "They need frequent bite-size promotions, and things can't be ambiguous. You have to tell them where the goal line is. They need it more than past generations," she says.

Because these younger workers are so hands-on, giving them real-world experience is the best way to groom them for leadership roles, Phillips says.

"You can't lecture to this group. They get bored so easily. They learn best by doing. The way they learn is by figuring it out," she says. "So give them tasks that stretch them a bit but that they're still able to do."

Susan Donovan, senior director of application development and support at the National Rural Electric Cooperative Association in Arlington, Va., already sees these influences.

At 39, she's a Gen X'er. She says a key characteristic of her generation and the millennials is the need for flexible work schedules "so you can be a mom, an employee and a manager."

But younger workers also want more than flexibility, she says. They want interesting work that keeps them engaged. They want to keep up their learning. They want the freedom to push boundaries and try new strategies and technologies without fear of reprimands for getting it wrong the first time.

"They do care about the work, they just don't want to be on the same project year after year after year," Donovan says. "So we need to personalize what projects people are on."

"We like to learn and advance our understanding of things, and when we have a job that allows us to do that, that's a big deal," says Deric Abel, a Linux administrator at America First Credit Union in Riverdale, Utah.

Abel, 29, says one of his friends, a network engineer, recently left a job in part because he felt that he was boxed in and spending too much time in meetings.

That mentality translates into how Abel says he'll manage people as he moves into positions with more authority — which he's on track to do. He says he would add more flexibility by, for example, allowing IT workers to choose their own operating systems for their desktops. He wants to add flextime and off-site work options. He envisions being a boss who's more of a facilitator than a manager.

Dawn Augustino, 44, an IT technical director at the University of Pennsylvania, has similar notions about the future of the IT workplace. She sees an organization where ideas and results — not the number of years on the job — earn people promotions. She also wants to foster an environment in which workers can promote their ideas throughout the organization, and where they can try new strategies and feel comfortable bringing problems to her as the boss.

"It will be very flat," she says, adding that she already manages that way.

Jeff Schwartz, global and U.S. talent leader at Deloitte Consulting LLP, says next-generation leaders will also have a more global perspective. They'll be more comfortable with diversity, seize the latest technologies and look for results-oriented work environments that put the value on the job done rather than the hours worked, he says.

"The X and Y generations have come up in world where you have more options," says Schwartz. "Hopefully their leadership and management style will evolve to take advantage of some of these complexities." ◆

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The Next Leadership Wave

Organizations with a keen eye on the future of their businesses are already working hard to recruit next-generation leaders. As vice president of information systems and computing at the University of Pennsylvania, Robin Beck spends plenty of time thinking about the best ways to attract and groom new talent.

"We believe flexible work arrangements, strong benefits, training programs and interesting work all help with both Gen X and Gen Y," she says.

Beck says workers want different things from their jobs depending on who they are and where they are in their own lives. Some value flextime, others job security. Everyone wants interesting and meaningful work.

Jeff Schwartz, global and U.S. talent leader at Deloitte Consulting, says most organizations need to better accommodate individual needs if they want to successfully recruit the best young workers.

Most IT organizations, Schwartz says, lack a targeted, aggressive recruiting strategy. Instead, they rely on the company's overall brand and word of mouth, which isn't particularly effective, he adds.

Moreover, companies need to "create targeted programs for different generations of workers," he says. Deloitte's research has found that millennials, particularly those in IT, are looking for "opportunities to work with senior staff and company leaders," says Schwartz.

"A hallmark of this generation is its desire to change positions regularly to gain experience in a range of roles throughout the organization," he says. "You can address this desire by working with Gen Y employees to identify their deep-rooted skills, interests and knowledge, find their best fit in the organization, and craft the job design and conditions that help them perform."

— MARY K. PRATT

THORNTON A. MAY

Imagining the Shape of The 2020 IT Workforce

Just as servers, storage and desktops have been virtualized, so too will the labor component of IT.

HOW WE WORK and how we think about work have been evolving since we humans came into existence. The ancient Greeks and Hebrews viewed work as a bad thing. It was what slaves did. Over time, cultural norms celebrating and encouraging hard work became secularized such that by the time of Ben Franklin's Colonial America, idleness was viewed as a disgrace.

As the centuries passed, hunting and gathering gave way to agriculture. And what craftsmen used to do by hand was automated. Industrial work was replaced by information work. Since 1956, white-collar workers in America have outnumbered blue-collar workers.

In the early Information Age of the 1950s, the objective of mainstream workers was to secure work that required considerable thinking, decision-making and judgment. A college degree was thought to give one access to these "good" jobs. Generally, workers were satisfied with their work and wanted to be successful.

But somewhere in tbe mid-'90s, work became very complicated. IT work in particular became semi-indefinable. Is someone who translates medical notes into insurance codes an IT worker?

According to the federal government, there are 4 million IT workers in the U.S. David Foote, a frequently cited authority on IT labor issues, says the U.S. IT workforce is actually 20 million to 25 million professionals. Hard and actionable data about the current IT labor pool is very sketchy.

What's worse, a generally accepted overarching framework for IT doesn't currently exist. Traditional white-collar/blue-collar, manufacturing economy/service economy explanations are no longer adequate. The business specialist/tech specialist framework set forth in *Computerworld's* cover story (see page 14) is a step in the right direction, but it doesn't go far enough. CIOs lack a framework for understanding what's happening in the IT workplace.

There are some things we *can* know about the future of the IT workforce. We know that in 2020, CIOs will oversee a bubbling massala of multigenerational attitudes and aptitudes. In the Internet Age, IT work has become globalized (it can be done anywhere), specialized (it's very situation-specific), professionalized (certifications increasingly define IT's skill sets) and atomized (with granular articulation of required tasks). These trends will continue.

But the major and material trend that will most dramatically impact the shape and deployment of the IT workforce is cloud labor. The labor component of IT will be virtualized, just as servers, storage and desktops have been. Which vendor will be the VMware to the buge and emerging virtual IT labor market is still up in the air.

Finally, a universal skills vocabulary will emerge, making it easier to articulate the IT work to be done. CIOs and the project managers who work for them will go online to match up skills, prices, availabilities and schedules. Sixty percent of the heavy lifting of IT work will be negotiated for online (think eBay).

There will be an emergence of analytically gifted innovators within IT. They can be found already in the innovation departments at future-focused enterprises like Kroger and McDonald's. Working like venture capitalists, these fact-based, grounded-in-reality entrepreneurs look at what is possible on the edge of technology, then turn over their ideas to mainstream IT for scalar operations.

So don't despair. Great jobs will still exist in the IT shop. ◆

Thornton May is author of *The New Know: Innovation Powered by Analytics* and executive director of the IT Leadership Academy at Florida State College at Jacksonville. You can contact him at thorntonamay@aol.com.

IT|careers

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Saber Software, Inc. is accepting resumes for the following positions:

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in Corvallis, OR (Ref. #SABCORIT1); Frankfort, KY (Ref. #SABFRAIT11); Tulsa, OK (Ref. #SABTULIT11); and Raleigh, NC (Ref. #SABRALIT11). Design, develop & execute all testing-related activities on applications, infrastructure or HW components of IT solutions, which include both third party SW & internally developed applications & infrastructure.

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Mail resume to Saber Software, Inc., 19483 Pruneridge Avenue, MS 4206, Cupertino, CA 95014. Resume must include Ref. #, full name, email address & mailing address. No phone calls please. Must be legally authorized to work in the U.S. without sponsorship. EOE.

Computer Professionals for (West Windsor, NJ)IT firm. Implement and customize Java & PLM applications, Analyze, design and develop the existing applications and delivering AS-IS Modes Drawing Business Process Models for TO-BW apps. Involve in development of components using J2EE architecture such as JSP, Servelets Java Beans. Involve in DB Unit testing, manual testing and also use TOAD, CVS, PVCS. Masters degree with 1/yr exp in the related field. Apply w/2 copies of resume to H.R.D, Empower Technology Solutions, Inc.196 Princeton Hightstown Road, Building 2 Suite 14, West Windsor, NJ-08550

Quality Assurance Analyst: Create , prepare & implement systems quality assurance reviews for numerous applications. Reqs usage of HP/Mercury Quality Center Exp w/ Mindreef SoapScope, IBM ClearQuest, Green Hat (Solitice) Integra as well as Hogan CIS mainframe and DB2. Job in NC – Potential transfer to IL or FL. Fax resume to (866)457-2812 Attn: Joe Silvestrini @Signature Commercial Solutions, LLC, 200 College St, #1400, Charlotte, NC 28202.

S/W Engineer, Piscataway, NJ and other client locations. Ana, dsgn, dev, impl, cust & maintain appln & sys using Java, J2EE, Oracle, EJB, JDBC, JSP, AJAX, Java Script, JUnit, CSS, JSF, Swing, Struts, Spring, Hibernate, RMI, SOAP, Weblogic, Apache, Win, Linux, PL/SQL, JMS, Clear Case, Clear Quest, Mercury Quality Center, TOAD, Eclipse, SOA, & Webservices. MS in CS, MIS, CIS, Eng (any), Bus, Tech, Math, or related+1yr exp. Salary DOE. Post your resume: http://ibs-consulting.net Or mail International Business Solutions, 255, Old New Brunswick Road, Piscataway, NJ 08854 & ref JPK2012.

Sr Database Administrator (Regions – Birmingham, AL) Participate in the design, implementation and support of UDB/DB2 databases and systems utilizing minimum requirements. Provide technical leadership for DB 2 related initiatives, database administration and maintenance activities. Define and implement policies and procedures for ensuring the availability, security and integrity of the DB2 databases. Participate in 24 x 7 on call support rotation.

Must have a Bachelor's Degree or foreign degree equivalent in engineering, computer science or related field and 5 years of experience in the job offered or 5 years in a DBA production support position. Experience may have been obtained concurrently and must include: (i) 5 years experience in DB2 or UDB, (ii) 5 years experience with OS platforms in any combination of Linux, UNIX and Windows, (iii) 5 years experience with Capacity planning related to database storage, CPU and memory; (iv) 5 years of experience in any combination with both physical and logical database design, (v) 5 years of experience installing, configuring, and maintaining multiple DB2 or UDB production databases; (vi) 5 years experience in Optimizing the environment with respect to data access methods, access performance, space optimization, data integrity, system performance and system availability; (vii) 5 years experience administering and installing DB2 or UDB database fixpacks utilizing a formal change process, (viii) 5 years exp designing, implementing & troubleshooting backup/recovery of DB2 or UDB databases to ensure data integrity, (ix) 5 years experience performing performance tuning including creation & tuning of stored procedures, index creations, troubleshooting SQL statements and queries, (x) 5 years of Shell scripting experience in UNIX using any combination of Korn Shell, sed, awk and Perl; (xi) 2 years experience extended Enterprise Edition (EEE) partition databases configuring data warehouse applications, (xii) 5 years experience performing disaster recovery planning for database restoration in alternate locations, (xiii) 5 years experience providing support to multiple application development groups in the areas of any combination of database design and optimization, (xiv) 5 years experience with database monitoring procedures and utilities, (xv) 5 years experience in database security.

Must have legal authority to work in U.S. Any suitable combination of education, training or experience is acceptable. Resume to Regions Financial Corporation, Attn: Dana Allison, Riverchase Operation Center, 2090 Parkway Office Circle, Birmingham, AL 35244

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Oracle Database Administrator (Regions - Birmingham, AL) Utilize minimum requirements to design, create and maintain client/server environment databases. Audit and quality control of databases. Consult with various technology teams and advise uses on access to a large farm of Oracle client/server databases. Provide 24x7x365 database support on call rotation.

Must have a Bachelor's Degree or foreign degree equivalent in technology, computer science or related field and 2 year of experience in the job offered or 2 years in an Oracle Production DBA position with experience in Oracle, UNIX and Windows. Experience may have been obtained concurrently and must include: (i) 2 years experience with both RMAN and OEM, (ii) 2 years experience with both physical and logical database design; (iii) 2 years experience installing and maintaining multiple Oracle production databases, (iv) 2 years experience performing schema administration and maintenance, (v) 2 years experience administering and implementing Oracle database patches utilizing a formal change process, (vi) 2 years experience administering database security and access control best practices, (vii) 2 years experience performing database optimization and tuning including creation and tuning of stored procedures, index creations, troubleshooting SQL statements and queries, (viii) 2 years experience Shell scripting in UNIX, (ix) 2 years experience performing disaster recovery planning for database restoration in alternate locations; (x) 2 years experience designing, implementing, and troubleshooting backup/recovery of Oracle databases to ensure data integrity; (xi) 2 years experience providing support to multiple application development groups in the areas of database design and optimization, (xii) 1 year experience establishing and maintaining test/development, disaster recovery and production database instances, (xiii) 2 years experience performing table level partitions. Must have legal authority to work in U.S. Any suitable combination of education, training or experience is acceptable. Resume to Regions Financial Corporation, Attn: Dana Allison, Riverchase Operation Center, 2090 Parkway Office Circle, Birmingham, AL 35244

Technical Leader-Software Engineers II [Richmond, VA] Manage/lead retirement benefits IT consulting project team to design/develop system applications from inception to delivery. Require BS degree in Computer Science or MIS and 5-year w/job offered or 7-yr w/ SW engineer, technical architect or software consultant. Experience should include enterprise-level projects using OO, C#, J2EE, .Net, IBM FileNet, ASP.Net, Oracle, SQL, LoadRunner. Also require knowledge of statewide govt benefits IT mgmt systems gained thru 6+ mos of work. Send salary reqt, resume, references to: Bhasin, Chief HR, Sagitec Solutions, LLC, 2233 N. Hamline Av. #420, Roseville, MN 55113

IT|careers

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Computer Programmer (E Hampton, NY) Assist client on prjcts. Conduct tests i.e. functional, regression, volume & stress testing. Requirements gathering. Execute testing. Client interaction. Onsite & offshore coordination. Use Mainframe and COBOL, JCL and CICS. BA in Electronic or Comp Sc., 2 yrs exp. Must be willing to relocate to unanticipated client sites in USA incldg IA, AZ, SD, CA, MD. Resume with ref #R259P to Robert Gatto Associates @ jobs2@gattoassociates.com

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Viraj, LLC seeks software engineers, programmer/system analysts, DBA to customize applications using specials tools. Travel required for some positions. MS or BS+5 exp. Please send resume to hr@viraj.com

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Sr. Lvl position, Sr. Programmer Analyst, Sr. S/w Eng. to plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis. Business analysis & comp. programming. Apply w/2 copies of resume to H.R.D. Turing Systems Inc. 55 Carter Dr, Suite # 210, Edison, NJ 08817

Research In Motion Corporation (US), Bellevue, WA, positions are avail:
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Software Tools Developer – WA4025

Research In Motion Corporation (US), Sunrise, FL, positions are avail:
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Project Lead-Data Modeling Integration needed at unanticipated client sites using ER-Win, Visio, PowerBuilder, Oracle, Teradata, DB2, ERP, ETL tools, IBM Data stage, OLTP, OLAP, logical & physical modeling. Mail resume to CS Solutions, Attn: T. Shetty, 4660 Slater Rd., #110, Eagan, MN 55122

Systems Administrator (E Hampton, NY) Install, maintain, backup, archive, troubleshoot, performance monitor, mgmt & support of Solaris & Unix (Solaris 8 & 9,HPUX 11.X & Linux) servers w/ Sun hardware & software w/ critical apps & dbase in production ,UAT, & dvlpmnt environment & extending end-to-end Unix Support. Use Legato Backup tool. Performance analysis. Co-ordinate w/ on & off shore technical leads. Recommend, install & enforce Security level & patches. Incident mgmt. Document all internal use & system changes. Interface btwn mgmt, end-users, application owners & Dbase Admins. Identify rqrmnts & discuss w/ team. Provide application support. Propose & implement technologically feasible solutions. Prepare technical design doc for network infrastructure. Study new methodologies & tools available in the marketplace. Manage client Network infrastructure. Participate in Asset & Product Mgmgt & Disaster Recovery. BA in any field, 2 years exp in job offered. Must be willing to relocate to unanticipated client sites in USA incldg IA, AZ, SD, CA, MD. Resume with ref #R259Q to Robert Gatto Associates @ jobs2@gattoassociates.com

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Please mail resumes with reference number to Applied Materials, 2881 Scott Blvd. M/S 2021, Santa Clara, CA 95050. No phone calls please. Must be legally authorized to work in the U.S. without sponsorship. EOE.

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SHARKTANK

TRUE TALES OF IT LIFE AS TOLD TO SHARKY

Wherefore Art Thou, CIO?

This city-government IT group is starting to use two-way radios again because staffers aren't answering their cell phones, reports a pilot fish on the scene. "In using them, I dusted off the old call-sign sheet," fish says. "The staff wanted better call signs than the stodgy 'Tech1,' 'Tech2' and so on. One, who is ex-military, suggested using the person's initials but in military-letter speak. Each letter has a word associated with it that makes it easy to understand over a radio. For example, Dave Doe is 'Delta Delta.' This sounded good until we translated our CIO's initials. We didn't think he was going to answer to 'Juliet Romeo, are you out there?' – and none of us were sure we'd have the guts to say it on the channel."

Oops!

VP of development has a brainstorm for saving $40,000 a year: Just move a production system onto a development machine. "I immediately contacted the database administrator and told him that this was a very bad idea," says a pilot fish on the scene. "The DBA said, 'Of course I know that! I told the VP we shouldn't do it. But orders are orders.' " So DBA moves a big client's system onto the development server, and everything's fine for two weeks – until a developer is testing an app and it goes haywire and spawns thousands of simultaneous jobs. Result: In minutes, the development server crashes, taking with it the big client's system that's running on the same physical machine. "Our customer lost access to their production database for about an hour, until we could stop the machine and halt the geometric progression of jobs," fish says. "The next day, the VP instructed the DBA to move the production database back onto its own machine."

Great Idea – Glad You Thought of It!

Part of this pilot fish's job is posting notices about job openings on a local government agency's Web site. "For this particular job posting, the application process was to click on a link on our page so the applicant could apply online," says fish. But fish notices the link is just to the county's home page, not the jobs section. E-mail to boss: Should I link this directly to the jobs page, so applicants will have an easier time finding it? Boss: "No, we haven't done that in the past, so I think you can just keep what we have." Fish codes the page and posts it – and two minutes later gets another e-mail from the boss: "Can you put in a link to the actual location? It can be difficult to find the specific job on the county Web site."

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OPINION

FRANK HAYES

Before We Get to 2020, Let's Look at IT Today

Messy as things are, we're holding our own.

LET'S GET some perspective on this 2020 vision of IT that Julia King writes about in this issue (see page 14). After all, it's a long time until 2020, when we'll see the elegant dismantling of today's corporate IT. In the meantime, on the run-up to Labor Day, what's the state of IT work in 2010? In a word: messy.

No surprise there. We're in the third year of belt-tightening budgets and long-past-the-fat layoffs. We've squeezed out pretty much all the costs and people we can from IT. Result: We don't have the luxury of working by the book, the job description or the org chart. We're cutting corners, cutting deals with users and cutting across the official lines of responsibility.

And we're mostly keeping everything running. Nobody has much slack, everyone's exhausted, and there's a lot of deferred maintenance that will have to be paid for someday. Still, messy as things are, we're holding our own.

Embrace that mess. If history is any guide, we'll see more of it, not less.

Back to that vision: By 2020, will we really have big chunks of the IT shop up in the cloud, and the rest of IT embedded in non-IT departments?

Maybe. After all, we've been headed that way for decades. Remember, in the 1970s, data processing was all about safeguarding corporate data on the mainframe and cranking out reports on green-bar paper. It was well-ordered, sensible and elegant.

Then came the 1980s and PCs, spreadsheets, LANs, power users, GUIs, real-time data and client/server applications. Now *that* was a mess — but a mess that made users a lot more effective. Ever since, IT work has been about getting closer to users, both to help them and to keep them out of trouble. Compared with 1980, we're already embedded in non-IT departments. We're just not on their payrolls.

And the cloud? Salesforce.com was launched in 1999, and for the past decade corporate IT has just been getting cloudier, with cloud services, cloud storage and cloud hosting. It almost seems as if we've been on a straight line toward that 2020 vision for the past 30 years, doesn't it?

Except . . . well, IT is messy, and getting messier. All the elegant, well-defined parts can easily be outsourced or sent up to the cloud, and many have been. What remains is just the messy tactical stuff: quick-hit scripting, emergency problem-solving, fast operational work-arounds.

Oh, there's also the problem of managing all those cloud vendors, whose interests lie in making themselves profitable, not in making your company successful. And there's the challenge of dealing with business users who want things that don't map exactly to what the cloud offers. And business-side VPs who won't cooperate with one another's IT plans. And cloud vendors that evaporate. And CEOs who believe in panaceas. Messy, messy, messy.

Yes, even if classic IT is gone by 2020, all the classic IT problems will still be around — and still be a mess.

So stop worrying, and embrace the mess. Between the economy and that hovering cloud, this is a year when flexibility, ingenuity and a healthy tolerance for a little chaos are what we need in order to survive and help our companies and our users thrive.

And by Labor Day 2011, maybe we'll have a bit more breathing room — and a slightly clearer view of 2020. ◆

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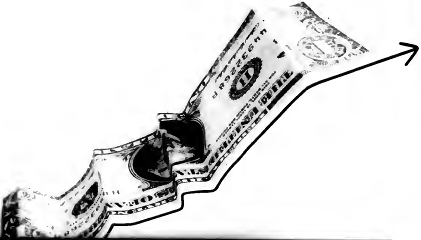

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